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THE PERFECT MAGIC SQUARES FOR 1908.*

By DR. G. B. M. ZERR, Philadelphia, Pa.

By Perfect Magic Squares are meant those made up of successive integral numbers. Suppose we denote the number of integers on a side of the Magic Square by n; then, if we start with unity, and write the numbers successively until the square is filled, in magic arrangement, each column, each row, and each of the two diagonals of the square will add to a sum equal to $\frac{n^3+n}{2}$. Whenever $\frac{1908-(n^3+n)/2}{n}$ is an integer we can form a perfect magic square for 1908.

$\frac{1908-(n^3+n)/2}{n}+1=\frac{3816-n^3+n}{2n}$ =the least integer permissible for forming the square. $\frac{1908-(n^3+n)/2}{n}+n^2=\frac{3816-n+n^3}{2n}$ =the greatest integer permissible for forming the square.

The only values of n for 1908 are 3, 8, and 9.

For $n=3$, least integer=632, greatest integer=640.

For $n=8$, least integer=207, greatest integer=270.

For $n=9$, least integer=172, greatest integer=252.

The three magic squares written out are as follows; all of which sum magically 1908.

$n=3$.

639	632	637
634	636	638
635	640	633

$n=8$.

207	269	209	267	266	212	264	214
262	216	260	218	219	257	221	255
223	253	225	251	250	228	248	230
246	232	244	234	235	241	237	239
238	240	236	242	243	233	245	231
247	229	249	227	226	252	224	254
222	256	220	258	259	217	261	215
263	213	265	211	210	268	208	270

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*We pay our respects to the year just gone, through Dr. Zerr's article, and trust that some of our readers may do as much for 1909. EDITORS.

$n=9$.

218	229	240	251	172	183	194	205	216
228	239	250	180	182	193	204	215	217
238	249	179	181	192	203	214	225	227
248	178	189	191	202	213	224	226	237
177	188	190	201	212	223	234	236	247
187	198	200	211	222	238	235	246	176
197	199	210	221	232	243	245	175	186
207	209	220	231	242	244	174	185	196
208	219	230	241	252	173	184	195	206

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ON THE EQUATION $x^n+y^n=nz^n$.[*]

By **DR. JACOB WESTLUND, Purdue University.**

E. Maillet[†] has proved that the equation

$$x^n+y^n=nz^n$$

is not solvable in rational integers, when n is a *regular*[‡] prime. The object of the following note is to prove the impossibility of the above equation for any odd prime n, when z is not divisible by n.

If z is not divisible by n, it follows that neither x nor y can be divisible by n. We may also, without loss of generality, assume x and y relatively prime. Now it can easily be shown that x^n+y^n is either not divisible by n or is divisible by n^2 at least. For we have

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[*] Read before the Chicago Section of the American Mathematical Society, March, 1908.

[†] *Annali di Matematica*, Series III, Vol. 12. See also, *Acta Matematica*, Vol. 24.

[‡] A prime n is said to be a *regular* prime, when it is not a factor of the numerator of any one of the first $(n-3)/2$ Bernoullian numbers.